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due to Unger than the *Genera Plantarum* would lead us to believe. Unger was anxious to furnish floral diagrams for the entire work, and offered four drawings to Endlicher as models. Although they were mutually agreed on the plan, it was for some unknown reason abandoned, and this phase of systematic botany was thereby retarded a score of years ; for it was not until the days of Eichler that floral diagrams of comparable excellence with those originals of Unger first made their appearance.

We are reminded, too, in these days of ecological enthusiasm that there is nothing new under the sun ; for even as early as 1836 Unger was actively engaged in the study of the influence of soil and climate on the distribution of plants, regarding a floral region as "ein meteorologisches und geognostisches Gemälde." To use his words : "A floral picture should be drawn, which must not only show its individual parts in the relations of space and time, but also the causal relations between external factors and inner life should be studied." Unger is therefore to be regarded as one of the founders of the biological or ecological method in systematic botany.—EDWIN B. ULINE, *Mankato, Minn.*

New elementary text-books.

THE past few years have witnessed many notable advances in education, but none more remarkable than the wonderful improvement in the teaching of elementary botany, at least in its theory. From its prevailing state of well-nigh barren formalism of less than ten years ago, it has leaped forward until it has become a vigorous and sympathetic representation of the science. This progress has been both marked and stimulated by a series of noteworthy works, the latest and most advanced of which is Professor Coulter's *Plant Structures*.[4] Not only does this work mark the highest degree yet reached in books devoted to the newer mode of teaching the science, but it probably marks the highest point it will reach, for it represents very nearly or quite the logical extreme of the tendencies of recent years.

Any consideration of such a work as *Plant Structures* must take account of it from two points of view : first, its botanical merit, and second, its adaptability to the purposes for which it was prepared. As to the former, the present reviewer has little but praise. That the work would be quite in touch with the present state of knowledge, both in fact and in spirit, was of course to be expected of its author, and this expectation is fully justified by the book. It is not entirely free from errors, but these are so slight as to be inappreciable in the general excellence of the work. It is written with great clearness, illustrated fully and beautifully, and as a whole proportioned judicially. Whether viewed from a botanical, a literary, or an artistic standpoint the book is admirable.

[4] COULTER, JOHN M.: Plant structures, a second book of botany. Pp. x+348. *figs. 289.* New York: D. Appleton & Co. 1899. $1.20.

Passing next to consider its adaptability to elementary teaching, it becomes at once evident that the author's aim has been not only to meet the best conditions of the present, but to lead the teaching of the science into a better estate. As a work intended for use either now or in the future, by beginners, however, it seems to the present reviewer not free from faults. Some of the subjects particularly emphasized, especially the alternation of generations and the morphological transitions from group to group, though immensely important and full of meaning to advanced students, are too abstract to be of either much interest or profit to beginners, whose basis of fact is extremely slender. The treatment of these topics is particularly lucid, but one cannot resist the impression at times that Professor Coulter, in writing these parts, had his colleagues rather than his students in mind. For this reason the book would seem better fitted for the use of students of some maturity, and especially for those who already have studied botany to some extent, and who wish to go over the subject systematically.

Again, the treatment of physiology seems not only inadequate in relative amount, but also unfortunate in mode. The former point may be met if the student uses the companion volume *Plant Relations,* which contains considerable physiology; but probably most students, especially most school pupils, will use only *Plant Structures.* Several of the leading physiological topics are not only at least as illuminating as some of the morphological ones, which the author treats so well, but they are equally capable of laboratory study and demonstration. Indeed taking the two volumes *Plant Relations* and *Plant Structures* together, they appear to the present reviewer weak in their physiological parts, notwithstanding the immense importance of physiology as a basis for ecology. Moreover, physiology, taken in one mass by itself, as in *Plant Structures,* is apt to prove rather indigestible, and experience shows that its topics may be more profitably considered along with the structures in which the work is principally carried on. The morphology of the flower appears also to have received hardly adequate treatment, especially in view of the fact that it is a subject generally misunderstood by our teachers.

But these latter criticisms have to do more with matters of opinion than of fact, and opinions may well differ. Upon one point however we can all agree; that Professor Coulter has given us a most excellent book, and one that is sure to prove both stimulating and serviceable.— W. F. GANONG.

IN EVANS'S *Botany for beginners*[5] we have a handy little volume with some good points, but on the whole very crude. The plan of combining laboratory directions with reading text is not unwise, but the author has attempted to cover too wide a field. He is coerced, perhaps, by the English *bête noir,* the examinations of the Science and Art Department, and although

[5] EVANS, ERNEST: Botany for beginners. 12mo. pp. viii + 290. *figs. 271.* London and New York: The Macmillan Company. 1899.

he disclaims an intention to make a "cram" book, it is essentially that. The condensation, the selection of unsuitable and sometimes impossible material and subjects for beginners, the numerous errors of fact, and the crudity of many of the illustrations, some of which are utterly misleading, render the book valueless to teachers in this country. That it receives the hearty approval of a well-known English botanist in *Nature* indicates the wide divergence of standpoint in the teaching of botany in the two countries.—C. R. B.

TO THE multiplying list of American schoolbooks Dr. D. T. MacDougal contributes a modest little volume,[6] the most elementary of the recent ones, outlining "a study of the functions or action of the plants," whose "organs are considered chiefly as instruments for the performance of work, with but little attention to their morphology." The author thus depends upon the pupil's previous knowledge of the parts of plants, a knowledge which is amazingly scanty and inaccurate. However, by careful selection of topics and simple presentation, the author ensures the pupil, in the main, clear notions of the work that plants do.

But some topics are introduced in whose presentation the author is sorely hampered and of which the pupil is quite certain to get wry notions, because there is too little basal knowledge of the structures concerned. The most notable instance is in the section on "the way in which new plants arise," wherein the alternation of generations is discussed; a topic which the very elementary character of the book might well be held to preclude.

Nearly all the few defects of the book are chargeable to the striving after vividness, simplicity, and brevity, which are so dangerous yet withal so necessary in a book of this grade. That Dr. MacDougal has succeeded admirably no one who has tried to write a small and simple book will deny. We commend it to teachers who wish to interest pupils in plants at work.—C. R. B.

MINOR NOTICES.

AN elaborate monograph on the hemp, *Cannabis sativa*, by Briosi and Tognini, has been completed by the issue of the second part,[7] treating in minute detail and most thoroughly the internal anatomy, the first part being devoted to the flowers. The whole monograph, comprising 271 quarto pages and 49 plates, is a monument to the late Dr. Filippo Tognini and to his botanical master and associate, Dr. G. Briosi.—C. R. B.

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[6] MACDOUGAL, D. T.: The nature and work of plants: an introduction to the study of botany. 12mo. pp. xviii + 218. New York: The Macmillan Company. 1900. 80 cts.

[7] BRIOSI, GIOVANI E TOGNINI, FILIPPO: Intorno alla anatomia della canapa (*Cannabis sativa* L.). Parto seconda; Organi vegetativi. 4to. Dagli *Atti* dell' Istituto Botanico di Pavia II. 4:168–315. *Pl. 4–29.*